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Metal-insulator transition at a surface of a ferromagnetic-metal $La_{0.75}Ca_{0.25}MnO_3/SrTiO_3(100)$ thin film RYOTA SHIMIZU, AIMR, Tohoku University, SHUNYA NAKAMURA, YASUNOBU ANDO, EMI MINAMITANI, Department of Materials Engineering, The University of Tokyo, KATSUYA IWAYA, RIKEN, AIMR in Tohoku University, TAKEO OHSAWA, NIMS, AIMR in Tohoku University, SATOSHI WATANABE, Department of Materials Engineering, The University of Tokyo, TARO HITOSUGI, AIMR, Tohoku University, JST-PRESTO — We have performed low-temperature scanning tunneling microscopy/spectroscopy (STM/STS) measurements on a ferromagnetic-metal $La_{0.75}Ca_{0.25}MnO_3/SrTiO_3(100)$ thin film surface. Our topographic images show two-domain zigzag patterns with $(\sqrt{2}\times\sqrt{2})$ periodicities in the perovskite structure. In addition, we measured an energy gap at the Fermi level in our STS spectra, in contrast to the ferromagnetic-metal properties obtained by ensemble measurements. First-principle calculations suggest that the topmost zigzag structure is caused by the structural relaxation based on the orthorhombic nature in bulk, suppressing the carrier itinerancy.

Ryota Shimizu
Advanced Institute for Materials Research (WPI-AIMR), Tohoku University

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